

**WHAT IS CLAIMED IS:**

1. A phase noise fine tuning electronic device comprising:

a plurality of circuit units of a voltage control oscillator, wherein the  
5 voltage control oscillator includes a resonance circuit, a coupling circuit, and a  
oscillating circuit;

a first conductive layer for placing the plurality of circuit units, wherein  
a plurality of micro-strips of the conductive layer are patterned for connecting  
the plurality of circuit units;

10 a second conductive layer; and

a first insulation layer placed between the first conductive layer and  
the second conductive layer, the first insulation layer having a first opening filled  
with conductive material for connecting a first lower micro-strip patterned in the  
second conductive layer and a first upper micro-strip patterned in the first  
15 conductive layer such that the first lower micro-strip, the first upper micro-strip,  
and the insulation layer together form an adjustable capacitor of the coupling  
circuit, whereby phase noise of the voltage control oscillator is diminished by  
cutting the first upper micro-strip to change capacitance of the adjustable  
capacitor.

20 2. The electronic device of claim 1, wherein one end of the adjustable  
capacitor is connected to the resonance circuit and the other end of the  
adjustable capacitor is connected to the oscillating circuit.

3. The electronic device of claim 2, wherein a second upper micro-strip is patterned in the first conductive layer, and a second lower micro-strip overlapping the second upper micro-strip is patterned in the second conductive layer such that the second upper micro-strip, the second lower micro-strip, and the insulation layer together form a second adjustable capacitor connecting to an inductor of the resonance circuit so that an electronic characteristic of the resonance circuit is adjusted by partially cutting the second upper micro-strip, and wherein the second adjustable capacitor generates inductance to decrease a resonance frequency of the resonance circuit by cutting the second upper micro-strip in a first direction, and capacitance of the second adjustable capacitor is decreased to increase the resonance frequency of the resonance circuit by cutting the second upper micro-strip in a second direction, whereby an oscillating frequency range of the voltage control oscillator is fine tuned.

4. The electronic device of claim 3, wherein two ends of the second adjustable capacitor are respectively connected to the inductor and ground.

5. The electronic device of claim 4, further comprising a third conductive layer and a second insulation layer, wherein the second insulation layer is placed between the second conductive layer and the third conductive layer, the second insulation layer has an second opening filled with conductive material and the third conductive layer is connected to ground for grounding the plurality of circuit units in the first conductive layer and the second conductive layer.

6. A phase noise fine tuning electronic device comprising:

a plurality of circuit units of a voltage control oscillator, wherein the voltage control oscillator includes a resonance circuit, a coupling circuit, and a oscillating circuit;

5 a first conductive layer for placing the plurality of circuit units, wherein a plurality of micro-strips are patterned in the first conductive layer for connecting the plurality of circuit units;

a second conductive layer; and

a first insulation layer placed between the first conductive layer and the  
10 second conductive layer, wherein a first upper micro-strip patterned in the first conductive layer, a first lower micro-strip patterned in the second conductive layer, and the first insulation layer together forms a first adjustable capacitor connected to an inductor of the resonance circuit, and wherein the first adjustable capacitor generates inductance by cutting the first upper micro-strip  
15 in a first direction to decrease a resonance frequency of the resonance circuit, and capacitance of the first adjustable capacitor is decreased by cutting the first upper micro-strip in a second direction to increase the resonance frequency of the resonance circuit whereby oscillating frequency range of the voltage control oscillator is fine tuned.

20 7. The electronic device of claim 6, wherein two ends of the first adjustable capacitor are respectively connected to the inductor and ground.

8. The electronic device of claim 7, further comprising a third conductive  
25 layer and a second insulation layer, wherein the second insulation layer is

placed between the third conductive layer and the second conductive layer, the second conductive layer has a second opening filled with conductive material, and the third conductive layer is connected to ground for grounding the plurality of circuit units in the first conductive layer and the second conductive layer.

5

9. The electronic device of claim 8, wherein a second upper micro-strip is patterned in the first conductive layer to be used in the coupling circuit, and a second lower micro-strip overlapping the second upper micro-strip is patterned in the second conductive layer so that the second upper micro-strip, the second lower micro-strip, and the first insulation layer together form a second adjustable capacitor, whereby phase noise of the voltage control oscillator is decreased when fine tuning the voltage control oscillator by partially cutting the second upper micro-strip to adjust capacitance of the second adjustable capacitor of the coupling circuit.

15

10. The electronic device of claim 9, wherein two ends of the second adjustable capacitor are connected to the resonance circuit and the oscillating circuit respectively.